

We claim:

1. A method of welding metal components together comprising the steps of:

moving a laser beam spot in a first direction along an interface between a pair of metal components such that in the vicinity of the laser beam, metal from each component melts and vaporizes to produce a keyhole in a pool of molten metal;

discharging molten metal from an arc welding torch into the pool of molten metal; and

oscillating the laser beam spot in a direction different from the first direction such that the keyhole oscillates through the pool of molten metal and molten metal fills into the keyhole as the position of the keyhole changes.

2. The method of claim 1, wherein the laser beam spot oscillates in a direction transverse to the first direction.

3. The method of claim 1, wherein the weld is a lap-penetration weld.

4. The method of claim 1, wherein the weld is a butt weld.

5. The method of claim 1, wherein the weld is a lap-fillet weld.

6. The method of claim 1, wherein the metal components each comprise an aluminum alloy.

7. The method of claim 1, wherein the laser beam spot oscillates at a frequency of about 5 to about 120 Hz.

8. The method of claim 7, wherein the laser beam spot advances along the interface at a rate of about 5 to about 400 inches per minute.

9. The method of claim 7, wherein the weld is over about 0.1 to about 0.25 inch wide.

10. The method of claim 1, wherein the laser beam spot oscillates in a linear path.

11. The method of claim 1, wherein the laser beam spot oscillates in a circular path, an elliptical path, or both.

12. The method of claim 3, wherein one of the metal components is thinner than the other of the metal components, said thinner metal component being over about 0.1 inch thick.

13. The method of claim 1, wherein the arc welding torch advances in the first direction behind the oscillating laser beam.

14. The method of claim 1, wherein the arc welding torch advances in the first direction in front of the oscillating laser beam.

15. The method of claim 1, wherein the focused laser beam spot is round.

16. The method of claim 1, wherein the arc welding torch is a GMA welding torch.

17. The method of claim 1, wherein the arc welding torch is a plasma welding torch.